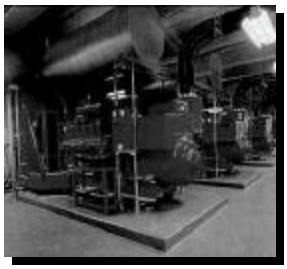
PUBLIC CONSULTATION MEETING TO DISCUSS REGULATORY APPROACHES TO REDUCE EMISSIONS FROM STATIONARY DIESEL-FUELED ENGINES

Update on Technology Demonstration Project and Test Method Workgroup



November 19, 2002

California Environmental Protection Agency

Air Resources Board

Technology Demonstration and Test Method Workgroup

Test Method Workgroup

- **Goals**
- **Background & issues**
- **Test methods overview**
- **Evaluation process**
- **Status**

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Workgroup-Goals

- Goals
  - Select stationary diesel engine in-use/ compliance test method for ATCM
  - Implement recommended method into ATCM
- Technical Workgroup members:
  - ARB
  - Industry
  - Districts
  - Academic/Research
- Met September 4, 2002

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Workgroup-Background and Issues

- Lack of correlation between the two methods
  - ISO 8178 used for verification and EPA certification
  - Method 5/100 used for permitting and compliance
- Variations in results between methods may
  - Impact product verification
  - Source compliance evaluations
- CARB Method 5 Issues
  - Controlled emission levels may be below detection limit
  - Expensive and difficult to perform in field
  - Potential method bias and artifact formation (primarily with impinger catch)

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Workgroup-Test Methods Overview

Compliance Test Method Comparison

CARB Method 5	ISO 8178
Standard Stationary Engine Test Method	Standard Method for Certification and Verification
Raw Exhaust	Diluted
Filter 248±25 °F (120±14 °C) Impinger (~60 °F)	Filter Below 125°F (52 °C) No Impinger
Field Available	Laboratory Availability Limited Field Availability
Method does not define test loads or speeds	Method defines engine test loads and speeds

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Workgroup-Test Method Evaluation Process

Data Needs

- Direct comparisons between methods
- Evaluate contribution of the impinger (backhalf) with speciation
- Review the PM measurement methods used in health studies
- Evaluate impact of changes to emissions inventories
- Evaluate the impact on the districts to implement any proposed changes

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Workgroup-Status

- Completed 3 direct CARB Method 5 / ISO 8178 comparisons on baseline engines
- Performing chemical characterization of the impinger components-selected Method 5 tests
- Reviewing PM measurement methods used in health studies
- Proposing to include PM minidilution testing in selected field testing
- Present preliminary results to Workgroup in January

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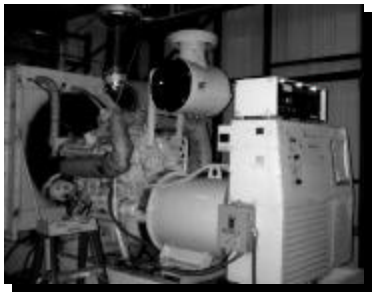
PM Demonstration-Program Overview

- Objectives
- Test matrix
- Test methodology
- Control device selection
- Schedule and contact information



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PM Demonstration-Program Objectives

- Combined CEC BUG and ARB Stationary Engine Demonstrations
- Demonstrate PM controls targeted to stationary engines
- Representative engines from database
- Measure baseline and controlled emission levels
- Evaluate key operating parameters which affect control technology
- Test method comparisons

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PM Demonstration-Test Matrix

- 2 Size Ranges
  - 15 engines (500 to 750 kW)
  - 3 engines (1750 to 2000 kW)
- 3 Age Ranges
  - Pre 1987
  - 1987-1996
  - Post 1996
- 3 Manufacturers
  - Caterpillar
  - Cummins
  - Detroit Diesel Corporation

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PM Demonstration-Test Methodology

- **7 Retrofit Control Technologies**
  - Active and Passive Diesel Particulate Filters
  - Diesel Oxidation Catalysts
  - Emulsified Fuel
- **Measurement Methods**
  - ISO 8178
  - ARB Method 5/100 (selected engines)
  - Test Cycles: ISO 8178-4
- **Emission Measurements**
  - Baseline Emissions
  - Retrofitted Emissions
  - Durability (168 hrs)

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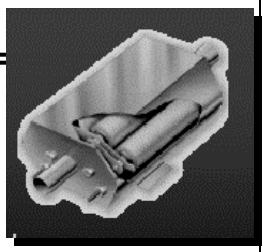
PM Control Technologies Selected for Demonstration



- **Active Filters**
  - Engine Control Systems DPF w/Electrical Regeneration
  - ArvinMeritor- DPF w/ Active Fuel Burner
- **Passive Filters**
  - Johnson Matthey-CRT
  - Catalytic Exhaust Products- Bare Filter +CDT Fuel Additive
- **Diesel Oxidation Catalyst**
  - Sud-Chemie DOC
  - CleanAir Systems DOC+FTF+CDT Fuel Additive
- **Emulsifed Fuel**
  - Lubrizol

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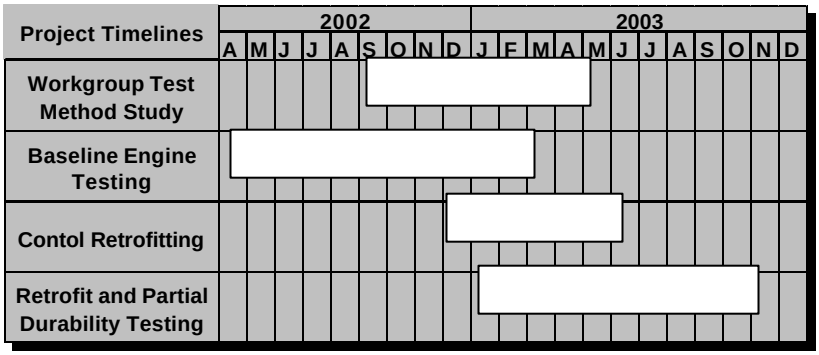
Demonstration Program Status

- Completed 8 ISO 8178 tests on baseline engines
- Completed 3 Method 5 comparison tests
- Identified and selected control devices
- Retrofitting in progress
- Retrofit testing to start in January

Program Schedule



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